

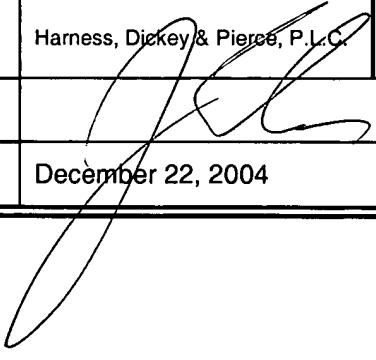
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HDP/SB/21 based on PTO/SB/21 (08-00)

AF/2665

<b>TRANSMITTAL FORM</b> (to be used for all correspondence after initial filing) <b>DEC 22 2004</b> PATENT & TRADEMARK OFFICE	Application Number	09/523,615
	Filing Date	March 13, 2000
	Inventor(s)	Yang CAO
	Group Art Unit	2665
	Examiner Name	Thomas E. Volper
	Attorney Docket Number	29250-001028/US

ENCLOSURES (check all that apply)				
<input checked="" type="checkbox"/> Fee Transmittal Form  <input checked="" type="checkbox"/> Fee Attached  <input type="checkbox"/> Amendment <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s)  <input type="checkbox"/> Extension of Time Request  <input type="checkbox"/> Express Abandonment Request  <input type="checkbox"/> Information Disclosure Statement  <input type="checkbox"/> Certified Copy of Priority Document(s)  <input type="checkbox"/> Response to Missing Parts/Incomplete Application  <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Assignment Papers (for an Application)  <input type="checkbox"/> Letter to the Official Draftsperson and _____ Sheets of Formal Drawing(s)  <input type="checkbox"/> Licensing-related Papers  <input type="checkbox"/> Petition  <input type="checkbox"/> Petition to Convert to a Provisional Application  <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address  <input type="checkbox"/> Terminal Disclaimer  <input type="checkbox"/> Request for Refund  <input type="checkbox"/> CD, Number of CD(s) _____	<input type="checkbox"/> After Allowance Communication to Group  <input type="checkbox"/> LETTER SUBMITTING APPEAL BRIEF AND APPEAL BRIEF (w/clean version of pending claims)  <input checked="" type="checkbox"/> Appeal Communication to Group (Notice of Appeal, Brief, Reply Brief)  <input type="checkbox"/> Proprietary Information  <input type="checkbox"/> Status Letter  <input type="checkbox"/> Other Enclosure(s) (please identify below):		
<table border="1"><tr><td>Remarks</td><td></td></tr></table>			Remarks	
Remarks				

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT			
Firm or Individual name	Harness, Dickey & Pierce, P.L.C.	Attorney Name	John E. Curtin
		Reg. No.	37,602
Signature			
Date	December 22, 2004		

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# FEE TRANSMITTAL for FY 2005

Effective 10/01/2004. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 500

## Complete if Known

Application Number 09/523,615  
Filing Date March 13, 2000  
First Named Inventor Yang CAO  
Examiner Name Thomas E. Volper  
Art Unit 2665  
Attorney Docket No. 29250-001028/US

## METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ Note

☒ Deposit Account:

Deposit Account Number 08-0750

Deposit Account Name Harness, Dickey & Pierce, PLC

The Director is authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Credit any overpayments  
☐ Charge any additional fee(s) during the pendency of this application  
☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

## FEE CALCULATION

### 1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1011	300	2011	150	Utility filing fee	
1012	200	2012	100	Design filing fee	
1013	200	2013	100	Plant filing fee	
1014	300	2014	150	Reissue filing fee	
1005	200	2005	100	Provisional filing fee	
SUBTOTAL (1)					(\$) 0

### 2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Total Claims	Extra Claims	Fee from below	Fee Paid
	-20 **	= 0	X	= 0
Independent Claims	-3 **	= 0	X	= 0
Multiple Dependent				= 0

Large Entity		Small Entity		Fee Description
Fee Code	Fee (\$)	Fee Code	Fee (\$)	
1202	50	2202	25	Claims in excess of 20
1201	200	2201	100	Independent claims in excess of 3
1203	360	2203	180	Multiple dependent claim, if not paid
1204	200	2204	100	** Reissue independent claims over original patent
1205	50	2205	25	** Reissue claims in excess of 20 and over original patent

\*\*or number previously paid, if greater; For Reissues, see above

## FEE CALCULATION (continued)

### 3. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	120	2251	60	Extension for reply within first month	
1252	450	2252	225	Extension for reply within second month	
1253	1020	2253	510	Extension for reply within third month	
1254	1,590	2254	795	Extension for reply within fourth month	
1255	2,160	2255	1080	Extension for reply within fifth month	
1401	500	2401	250	Notice of Appeal	500
1402	500	2402	250	Filing a brief in support of an appeal	
1403	1000	2403	500	Request for oral hearing	
1452	500	2452	250	Petition to revive - unavoidable	
1453	1500	2453	750	Petition to revive - unintentional	
1501	1400	2501	700	Utility issue fee (or reissue)	
1502	800	2502	400	Design issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17 (q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	790	2809	395	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	790	2801	395	Request for Continued Examination (RCE)	

Other fee (specify) \_\_\_\_\_

\*Reduced by Basic Filing Fee Paid SUBTOTAL (3) (\$500)

### 4. SEARCH/EXAMINATION FEES

1111	500	2111	250	Utility Search Fee	
1112	100	2112	50	Design Search Fee	
1113	300	2113	150	Plant Search Fee	
1114	500	2114	250	Reissue Search Fee	
1311	200	2311	100	Utility Examination Fee	
1312	130	2312	65	Design Examination Fee	
1313	160	2313	80	Plant Examination Fee	
1314	600	2314	300	Reissue Examination Fee	

SUBTOTAL (4) (\$0)

## SUBMITTED BY

Name (Print/Type) John E. Curtin Registration No. (Attorney/Agent) 37,602 Telephone 703-668-8000  
Signature Date 12/22/2004

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Serial No. 09/523,615  
Atty. Ref. 29250-001028/US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appeal No. \_\_\_\_\_

Appellant: Yang CAO  
Application No.: 09/523,615  
Group No.: 2665  
Filed: March 13, 2000  
Examiner: Thomas E. Volper  
For: APPARATUS AND METHOD FOR AUTOMATIC PORT IDENTITY  
DISCOVERY IN HIERARCHICAL HETEROGENOUS SYSTEMS

Attorney Docket No.: 29250-001028/US

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**BRIEF ON APPEAL ON BEHALF OF APPELLANT**

U.S. Patent and Trademark Office  
220 20<sup>th</sup> Street S.  
Customer Window Mail Stop **Appeal Brief - Patents**  
Crystal Plaza Two, Lobby, Room 1B03  
Arlington, VA 22202

December 22, 2004

12/23/2004 NSUTEMA1 00000067 09523615

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Serial No. 09/523,615  
Atty. Ref. 29250-001028/US

### **BRIEF ON BEHALF OF APPELLANT**

In support of the Notice of Appeal filed October 25, 2004, appealing the Final Rejection mailed July 23, 2004, Appellant hereby provides the following remarks.

#### **I. REAL PARTY IN INTEREST**

The real party in interest in this appeal is Lucent Technologies, Inc. The present application is assigned to Lucent Technologies, Inc., by an Assignment recorded on March 13, 2000, Reel 010673, Frame 0327.

#### **II. RELATED APPEALS AND INTERFERENCES**

The Appellant does not know of any appeals or interferences which would directly affect or which would be directly affected by, or have a bearing on, the Board's decision in this Appeal.

#### **III. STATUS OF THE CLAIMS**

Claims 1-4, 7-15 and 29-41 reproduced in the attached Appendix A are the claims on Appeal. Each of these claims is currently pending in the application.

#### **IV. STATUS OF ANY AMENDMENTS FILED SUBSEQUENT TO THE FINAL REJECTION**

No amendments have been filed by Appellant with the U.S. Patent and Trademark Office subsequent to the Appellant's receipt of the Final Rejection.

#### **V. SUMMARY OF THE CLAIMED SUBJECT MATTER**

Circuit switched systems employing time division multiplexing (TDM), for example, interconnect telephone instruments. A switching system may carry digitized telecommunications

signals over optical paths that are in conformity with synchronous optical network (SONET) standards. Such networks include network elements such as SONET network elements, SDH network elements, or wavelength division multiplexed network elements, for example. Circuit switching network elements include network elements which conform with SONET/SDH digital signal formats. The signal formats are described, for example, in a Technical Advisory entitled "Synchronous Optical Network (SONET) Transport Systems: Common Generic Criteria", TA-NWT-000253, Bell Communications Research, Issue 6, September 1990, which is hereby incorporated by reference. For a variety of reasons it may be important to know which port in a given network element (NE) within such a system is connected to a particular port of another NE within the system.

Although SONET systems may incorporate a facility for such port identification and network elements within a circuit switching telecommunications system may employ this facility to identify ports, network elements within a packet switching system do not typically provide for port identification.

With packet switching data is transmitted in packets, and the communications channel is only occupied for the duration of a packet's transmission. After the transmission, the channel is available for use by other packets being transferred for other users. The packetized transmission may be transmitted using asynchronous transfer mode (ATM) techniques, for example. Asynchronous transfer mode (ATM) is a connection-oriented transmission technique that employs fixed-size blocks of data, called cells, each of which consists of a five octet long header and an information field that is forty-eight octets long. Packet switching elements, such as ATM nodes or Internet Protocol (IP) routers, typically ignore SONET signaling that might otherwise

be employed to identify specific interconnected ports within a telecommunications network. Consequently, operator intervention may be required to accomplish such identification. Such a process would be time consuming, fraught with the potential for errors, and cost-prohibitive. Systems that employ both circuit switching and packet switching network elements and which employ SONET signaling may be referred to hereinafter as heterogeneous telecommunications systems. A heterogeneous telecommunications system that provides for automatic port identification would therefore be highly desirable (see Specification, pp. 3-4).

Before discussing the details of the present invention, it should be noted that although a network element may be referred to herein as a SONET/SDH network element, and or as an ATM network element, it is assumed that both types of network element employ SONET/SDH at the transport level. Additionally, it is assumed that the circuit switching network element executes the byte processing that might prove onerous to a packet switching network element, such as an ATM network element. The term "SONET/SDH" network element is used interchangeably with the term "circuit switched network element," and the term "ATM network element" is used interchangeably with the term "packet switched network element," herein.

As illustrated in the conceptual block diagram of Figure 1 (see Appendix B), a heterogeneous telecommunications system in accordance with the principles of the present invention includes a plurality of circuit switching network elements 100 (A1, A2, and A3) and a plurality of packet switching network elements 102 (B1, B2, and B3). Each of the network elements is connected to other network elements through ports, such as port 104 (P1), port 106 (P2), and port 108 (P3) of the circuit switching network element A1 and port 110 (P1), port 112 (P2), and port 14 (P3) of the packet switching network element B1 (see Specification, pp. 6-7).



In the illustrative conceptual block diagram of Figure 1, port P1 104 of NE A1 is connected through a link 116 to port P3 115 of NE B1, port P2 106 of NE A1 is connected through a link 118 to port P4 117 of NE B1, and port P3 108 of NE A1 is connected through a link 120 to port P3 114 of NE BN. Similarly, port P1 119 of NE A2 is connected through a link 121 to port P2 123 of NE B2, port P2 125 of NE A2 is connected through a link 127 to port P1 110 of NE BN, port P3 129 of NE A2 is connected through a link 131 to port P2 112 of NE BN. Finally, port P1 133 of NE AM is connected through a link 135 to port P1 137 of NE B1, port P2 139 of NE AM is connected through a link 141 to port P2 143 of NE B1, and port P3 145 of NE AM is connected through a link 147 to port P1 149 of NE B2. Each of the links 116, 118, 120, 121, 127, 131, and 147 employs a SONET/SDH transport level and in addition to the data they carry, overhead, control, information is sent through the links.

Although it may be possible to use the control information carried in these links to determine the port interconnectivity of the network elements A1, A2, AM and B1, B2, and BN, packet switching devices, such as the network element B1, would have to get involved in "byte processing" to take advantage of this overhead information. This additional byte processing burden would prove prohibitive, or, at the least, inconvenient for packet switching NEs. Nevertheless, this port interconnectivity information is required for some applications and manual discovery and recordation of this interconnectivity information also has significant drawbacks. In accordance with the principles of the present invention, an "out of band" communications channel, such as that formed by the link 122 and interfaces 124, 126, 149, 151, 153, and 155 respectively located within NEs A1, A2, AM, B1, B2, and BN. This out of band channel may take the form of a local area network (LAN) which connects a group of NEs and

which provides a path for management and control of the NEs thus connected. In accordance with the principles of the present invention, the NEs support STS-1 line overhead K1 and K2 byte protection switching, which is discussed in, Ming-Chwan Chow, Understanding SONET/SDH Standards and Applications, Andan Publisher, New Jersey, 1995 pp. 2-25 through 2-28 and 7-39 through 7-40, which is hereby incorporated by reference. More particularly, the NEs support the standard, at the least insofar as the K1/K2 byte definitions (only definitions for bits 6, 7 and 8 are illustrated) as set forth in the table of Figure 2 (see Appendix C).

In accordance with the principles of the present invention, K1 and K2 bytes, which are employed by both circuit switching and packet switching network elements for protection switching, are employed as a recognition signal whereby port identities may be automatically discovered using an automatic interconnection recognition protocol (AIRP). As indicated in the table of Figure 2 bit codes 101 and 100 are not previously assigned. Code 100 is used in accordance with the principles of the present invention as the AIRP SONET/SDH recognition signal. The new protocol (AIRP) may use either a LAN connection or serial link that employs TCP as a transport layer for communications sessions. Port interconnectivity may be discovered between two peers with a single AIRP session and, in order to establish and maintain the port interconnectivity information, an AIRP session should be run each time an NE is initialized or re-booted. As will be described in greater detail below, an NE may initiate the port interconnectivity discovery process by sending a port identification initiation message to an NE to which it is linked (see Specification, pp. 7-8).

In accordance with the principles of the present invention, an NE may, under various circumstances, such as its initialization, or re-booting, initiate a port interconnectivity discovery

process by sending a recognition request message to an NE to which it is bound through a network link. The message first passes through the initiating NE's group leader. That is, in accordance with the principles of the present invention, each group of network elements 100 and 102 elects a leader that coordinates the port identification process. The leader associated with the initiating NE queues port recognition requests from its NEs and, forwards the recognition requests from the initiating network element, such as network element A1 to a receiving network element, such as network element B1 through the out of band link 122. The initiating network element leader, NE A1 for example, awaits an acknowledgement signal from the receiving network element B1 and, once received, passes the acknowledgement signal to the initiating NE which then transmits a test message from a specific port, such as port P1 104 to the receiving network element B1. The test message transmitted by the initiating network element may be a SONET/SDH "K2 byte" protection message.

After sending an acknowledgement message to the initiating network element through the link 122, the receiving network element leader alerts the receiving NE, NE B1, for example, which begins polling its ports to detect which port receives the test message. Once the receiving network element detects which of its ports receives the test message (port P3 115 in this illustrative example), the receiving network element records the port binding information and stops polling its own ports. Additionally, the receiving network element B1 transmits a detection message to the initiating network element A1. This detection message includes the receiving network element's port identity and is transmitted, by the receiving NE leader, for example, through the out of band channel, link, 122. Upon receiving the detection message from the receiving network element B1, the initiating network element A1 stops sending the test message

through the SONET/SDH link 118, records the port binding information, and transmits a recognition acknowledgement message to the receiving network element through the out of band channel 122 (see Specification, pp. 8-9).

After initialization, each NE plays either a leader role or non-leader role. Each non-leader packet switching NE (ATM NE in the following examples) sets up a TCP connection with an ATM virtual leader. NE leaders, or virtual leaders, are "elected" as described below. An ATM virtual leader node sets up TCP connections with all the non-leader ATM NEs on the same out of band channel (referred to as a LAN below). Similarly, each non-leader packet switching NE (SONET NE in the following examples), sets up a TCP connection with a SONET virtual leader node and the SONET virtual leader node sets up TCP connections with all the non-leader SONET NEs on a LAN. Given M ATM NEs and N SONET NEs, the total number of TCP connections needed is  $2 * (M + N - 2)$ . (If, instead, a point-to-point based connection is employed,  $M^2 + N^2 - M - N$  connections would be required). Should a non-leader NE fail, either through failure of the NE itself or through a failure of the NE's LAN connection, the NE leader notifies a network management system (not shown) of the failure. If a leader NE fails, through failure of the NE or its connection to the LAN, the leader election process will be repeated and the newly elected leader will notify the network management system of the previous NE's failure.

After initialization, two end systems, that is, between two NEs, one from a circuit switching side and one from a packet switching side, that use an automatic interconnection recognition protocol (AIRP) in accordance with the principles of the present invention to exchange inter-connection recognition information will be referred to as "AIRP Peers". The

communication mechanism for AIRP is based on a LAN connection and employs TCP as a reliable transport layer for sessions. Between two multi-link connected AIRP peers, only one AIRP session is required. AIRP session should be established each time NE system is initialized or re-booted. In the illustrative embodiment of Figure 1 and in the discussions to follow M ATM NEs (packet switching NEs, in general) are connected through an operational LAN, and N SONET NEs (circuit switching NEs, in general) are connected through another operational LAN. A router (not shown) is used to inter-connect these two sub-networks. Each LAN has its pre-configured multi-cast address. Any ATM NE can use a SONET NE LAN multi-cast address to reach any SONET NE and any SONET NE may use an ATM NE LAN multi-cast address to reach any ATM NE. Each port of each ATM NE is identified through Switch Name, Slot No. and Port ID and each port of each SONET NE is identified through TID and AID (Port No. and NADDR) (see Specification, pp. 9-10).

The AIRP includes seven operational messages:

1. AIRP\_Recognition\_Request message, used to request the corresponding side to participate in inter-connection recognition process.
2. AIRP\_Recognition\_Notification message, used by SONET virtual leader to notify each SONET NE to start polling process.
3. AIRP\_Recognition\_Grant message, used by ATM virtual leader to grant certain ATM NE's link recognition request.
4. AIRP\_Recognition\_Response message, used to respond to the requesting side.
5. AIRP\_Recognition\_Detected message, used to inform the requesting side the corresponding inter-connection ID information.

6. AIRP\_ Ack message, used by requesting side as a positive acknowledgement message back to the requested side.
7. AIRP\_ Nak message, used by requested side to indicate certain negative acknowledgement scenario.

(See Specification, pp. 10-11.)

The state diagram of Figure 3 (see Appendix D) illustrates the various states an NE may assume and transitions between those states at the time of initialization. The process begins in step 300, the starting state, in which an NE sends an AIRP\_Hello message and starts an acknowledgement timer (ACK\_timer). If the NE is an ATM NE, it is equipped with an ATM group MAC address. If the NE is a SONET NE, it is equipped with a SONET group MAC address. At system initialization, the global variable "restart" is initialized to 0. From the starting state the process proceeds to step 302, the awaiting state. If the NE receives AIRP\_Leader\_Ack before the ACK\_timer expires, the NE stops the timer and transit to Step 304, the TCP setup state. If the NE receives any AIRP\_Hello message, it will return an AIRP\_Hello\_Ack message. If the NE receives an AIRP\_Hello\_Ack from other NEs, it will store the information contained in the AIRP\_Hello\_Ack messages. If the Ack\_timer times out before the NE receives an AIRP\_Hello\_Ack, the NE stops the timer returns to step 300, the starting state. If the Ack\_timer times out for want of an acknowledgment message from the leader, but the NE receives multiple AIRP\_Hello\_Ack messages from other NEs, the NE stops the timer and proceeds to step 306, the leader calculation state. A timeout or the reception of any message other than an AIRP\_Hello\_Ack message returns the NE to the starting state 300.

In the TCP setup state 304, the NE sets up a TCP connection with an NE identified as an NE leader. The NE also resets the state variable re-start = 0, and proceeds to step 308, the non-leader operational state. If the NE can't successfully establish TCP connection with the leader (connection time-out), the NE returns to step 300, the starting state. If the NE receives an AIRP\_Hello message, it returns an AIRP\_Hello\_Ack message (see Specification, pp. 11-12).

In the leader calculation state 306, the NE sorts all the MAC address including those received from the other NEs' AIRP\_Hello\_Ack messages and its own MAC address and "elects" a leader based on the addresses. For example the NE having the highest address may be used as the leader and, if the NE itself has the maximum MAC address, it is assumed elected and proceeds to step 312 where it operates as a leader. Otherwise, the NE proceeds to step 310 where it operates as a non-leader. If the NE receives an AIRP\_Hello message, it returns an AIRP\_Hello\_Ack message.

In step 308, the non-leader state, a SONET or ATM NE will operate in a non-leader mode as described in greater detail in the discussion related to Figures 7 and 5, respectively. If an NE receives an AIRP\_Hello message, it returns an AIRP\_Hello\_Ack message. If an NE receives an AIRP\_Close message the NE returns an AIRP\_Ack message and returns to step 300, the starting state. If an NE receives an AIRP\_Keep\_Alive message from the leader before the timer expires the NE returns an AIRP\_Keep\_Alive\_Ack message to the leader. If an NE does not receive an AIRP\_Keep\_Alive message from the leader within the timer period, the NE re-starts its Keep\_alive timer and proceeds to step 314, the retry state. All other operational messages will keep the NE in step 308, the operational state. The operational state is described in greater detail below.

In step 310, the “not-a-leader” state, an NE awaits the reception of an AIRP\_Leader\_Ack message and, if it receives such a message within the period of its acknowledgement timer, the NE records its leader NE’s information and proceeds to step 304, the setup TOP state. In step 310, a not a leader state, the NE records a leader’s information and proceeds to step 304 if it receives an AIRP\_Leader\_Ack message within the timer period. If the NE does not receive an AIRP\_Leader\_Ack message within the timer period, the NE proceeds to step 300, the starting state. If the NE receives an AIRP\_Hello message, the NE returns an AIRP\_Hello\_ack message (see Specification, pp. 12-13).

In step 312, the leader state, an NE, which is a virtual leader node, sends an AIRP\_Leader\_Ack message to all the NEs that have sent a Hello message to the leader node. If the value of the NE’s state variable re-start is 1, the NE notifies the network management system of the loss of the previous leader node. Additionally, the NE resets the re-start state variable to 0 and proceeds to step 316, a state in which the NE awaits connection. If the NE receives an AIRP\_Hello message, it returns an AIRP\_Leader\_Ack message.

In step 314, the Retry state, an NE returns an AIRP\_Keep Alive\_Ack message to the leader if the NE receives an AIRP\_Keep Alive message within the timer period. If the keep alive timer times out, the NE sets the re-start state variable to 1 and proceeds to step 300, the starting state. If the NE receives an AIRP\_Hello message, it will return an AIRP\_Hello\_ack message. In step 316, the await connection state, an NE that has been elected virtual leader proceeds to step 318 if it receives TCP connection requests and has set up TCP connections with other NEs. If the leader NE does not receive a TCP connection request during the timer period, the leader NE assumes it lost the LAN connection or some other failure has occurred with the LAN and the



NE will proceed to step 300, the starting step. If the NE cannot establish TCP connection with a particular node, the leader NE will drop that node from its waiting list. In such an event, the node dropped from the waiting list will re-broadcast an AIRP\_Hello message. If the leader NE receives an AIRP\_Hello message, it will return an ALRP\_Leader\_Ack message.

In step 318, the leader operational state, an ATM node will run in an ATM virtual-leader operational state, as described in greater detail in the discussion related to Figure 6. If the NE is a SONET node, it will run in a SONET virtual-leader operational state, as described in greater detail in the discussion related to Figure 8. Although it is assumed in this illustrative description that an ATM NE initiates the request and SONET NE responds, the reverse, a SONET NE initiating and an ATM NE responding could also occur, with the corresponding descriptive roles reversed. In brief, if a leader NE receives an AIRP\_Hello message in this state, the leader returns an AIRP\_Leader\_Ack message. The leader will periodically send a AIRP\_Keep\_Alive message to all the other connected NEs, awaits the reception of corresponding AIRP\_Keep\_Alive\_Ack messages from the NEs. If the leader does not receive an AIRP\_Keep\_Alive\_Ack message from a particular NE, the leader NE assumes that a failure of some sort has occurred with the NE, notifies the network management system of the failure and, and tears down the TCP connection with the failed NE. The leader NE will return to step 300, the starting state, if it receives an AIRP\_Close message or if it receives no AIRP\_Keep\_Alive\_Ack messages. Any other operational message will keep the leader in the leader operational state at step 318 (see Specification, pp. 13-14).

The conceptual block diagram of Figure 4 (Appendix E) illustrates a message exchange scenario among NEs in accordance with the principles of the present invention. In this

illustrative example, an ATM NE leader AL acts as a go-between for its associated NEs A1, Ai, AM and a SONET NE leader BL provides the same service for its associated NEs B1, Bj, BN. In this example all the ATM NEs send an AIRP\_Recognition\_Request to ATM NE leader AL, as indicated by the arrows 400. The AIRP\_recognition\_request message includes the physical link ID information, such as the switch name, slot number, and port number of an ATM port.

Each ATM NE includes a link-recognition FIFO queue and link recognition requests are placed in that queue as they are generated. A link recognition request may be passed on to the NE leader AL once the request has reached the front of the queue. After receiving link recognition requests from its associated NEs the ATM leader AL places the requests in its request queue, which is, illustratively, a FIFO queue and processes the requests as they emerge from the queue. In the case of a FIFO, as in this illustrative example, AL serves the requests in the order in which they are received. Other prioritization schemes are possible (see Specification, pp. 14-15).

Assuming the request from Ai arrives at the NE leader AL first, and reaches the front of AL's request queue, AL passes Ai's request to the SONET leader BL in step 402. The request is passed through an out of band channel, such as the LAN 122 of Figure 1. After the SONET leader BL receives the forwarded AIRP\_Recognition\_Request from the ATM leader AL, BL notifies all the connected SONET NEs by sending an AIRP\_Recognition\_Notification in step 404. Once the SONET NEs receive the notification, they start to poll their idle links' link status. In step 406 the SONET leader BL returns an AIRP\_Recognition\_Response to the ATM leader AL. After receiving the AIRP\_Recognition\_Response the ATM leader AL sends an AIRP\_Recognition\_Grant message to NE Ai in step 408. In response, the NE Ai begins to insert

a recognition signal into the link of interest 409. In accordance with the principles of the present invention a transition of SONET Channel Status (K2's bits 6,7,8) from 000 (Idle) to 100 (testing signal) identifies the connected port. The recognition employs SONET protection switching signals as described in greater detail in the discussion related to Figure 2. Upon detecting the recognition signal a SONET NE, NE Bj in this example, reports the reception of the detection signal by sending an AIRP\_Recognition\_Detected message to the SONET leader BL in step 410 (see Specification, p, 15).

After receiving the AIRP\_Recognition\_Detected message, the SONET leader NE BL returns NE Bj's port information to the ATM leader AL through an AIRP\_Recognition\_Detected message in step 412 and the ATM leader AL forwards this information to the NE Ai through an AIRP\_Recognition\_Detected message in step 414. When NE receives the AIRP\_Recognition\_Detected message, it stops inserting the recognition signal through its SONET link 409 and in step 416 returns an AIRP\_Recognition\_Ack to the ATM leader AL. In step 418 the ATM NE leader AL forwards the AIRP\_Recognition\_Ack message from Ai to the SONET NE leader BL. The SONET leader then sends an AIRP\_Recognition\_Ack message to all the connected SONET NEs in step 420. After receiving the AIRP\_Recognition\_Ack message, all the connected SONET NEs stop polling their idle links and SONET NE Bj checks the link corresponding to the detection signal to determine whether the link status returns to normal (idle). If the link status returns to idle, NE Bj sends an AIRP\_Recognition\_Ack message to the SONET leader BL in step 422. If the link status does not return to idle, the NE Bj sends an AIRP\_Recognition\_Nak message to the SONET leader BL in step 422. Once received, the SONET leader BL forwards the AIRP\_Recognition\_Ack or AIRP\_Recognition\_Ack message to

the ATM leader AL in step 424. In response to the reception of either message the ATM leader AL removes from its queue Ai's current recognition request, and forwards the AIRP\_Recognition Ack or AIRP\_Recognition\_Nak message to NE Ai in step 426. Ai also removes its current top of its link-recognition request queue. If its link-recognition queue is not empty, Ai will send another link recognition request to the leader AL~Ld and the process will proceed from there as previously described.

The format and content of protocol data units (PDU) employed in automatic port binding discovery, that is, the new automatic interconnection recognition protocol (AIRP) in accordance with the principles of the present invention are described immediately below.

Each AIRP PDU is an AIRP header followed by AIRP messages.

The AIRP header is:

Version	PDU length
---------	------------

Version:

Two octet unsigned integer containing the version number of the protocol. This version of the specification specifies AIRP protocol version 1.

PDU Length:

Two octet integer specifying the total length of this PDU in octets, excluding the Version and PDU Length fields.

AIRP uses a Type-Length-Value (TLV) encoding scheme to encode much of the information carried in AIRP messages (see Specification, pp. 16-17).

An AIRP TLV is encoded as 1 octet Type Field, followed by a 2 octet Length Field, followed by a variable length Value field.

Type	Length	Value
------	--------	-------

#### Type

Encodes how the Value field is to be interpreted.

#### Length

Specifies the length of the Value field in octets,

#### Value

Octet string of Length octets that encodes information to be interpreted as specified by the Type field.

In total, there are fourteen AIRP message types defined:

AIRP\_Hello TLV:

Type = 1	Length = $\sum_i \text{length}(\text{value\_field}_i)$
----------	--

Value field definition:

ATM/SONET group address
Sender's MAC Address
Sender's IP Address

AIRP\_Hello\_Ack TLV:

Type = 2	Length = $\sum_i \text{length}(\text{value\_field}_i)$
----------	--

Value field definition:

ATM/SONET group address
Receiver's MAC address
Sender's MAC address
Sender's IP address

(See Specification, pp. 17-18.)

AIRP\_Leader\_ACK TLV:

Type = 3	Length = $\sum_i \text{length}(\text{value\_field}_i)$
----------	--

Value field definition:

ATM/SONET group address
Receiver's MAC address
Sender's MAC address
Sender's IP address

AIRP\_Close TLV:

Type = 4	Length = $\sum_i \text{length}(\text{value\_field}_i)$
----------	--

Value field definition:

ATM/SONET group address
-------------------------

AIRP\_Keep\_Alive TLV:

Type = 5	Length = $\sum_i \text{length}(\text{value\_field}_i)$
----------	--

Value field definition:

ATM/SONET group address
ATM/SONET Leader's MAC address

(See Specification, pp. 18-19.)

AIRP\_Keep\_Alive\_Ack TLV:

Type = 6	Length = $\sum_i \text{length}(\text{value\_field}_i)$
----------	--

Value field definition:

ATM/SONET group address
ATM/SONET Leader's MAC address
Sender's MAC address

AIRP\_Reset TLV:

Type = 7	Length = $\sum_i \text{length}(\text{value\_field}_i)$
----------	--

Value field definition:

ATM/SONET group address
ATM/SONET Leader's MAC address
Sender's MAC address

(See Specification, pp. 19-20.)

AIRP\_Recognition\_Request TLV:

Type = 8	Length = $\sum_i \text{length}(\text{value\_field}_i)$
----------	--



Value field definition:

ATM/SONET group address
Destination's MAC address
Sender's MAC address
Message sequence No.
Port ID

AIRP\_Recognition\_Notification TLV:

Type = 9	Length = $\sum_i \text{length}(\text{value\_field}_i)$
----------	--

Value field definition:

ATM/SONET group address
-------------------------

AIRP\_Recognition\_Grant TLV:

Type = 10	Length = $\sum_i \text{length}(\text{value\_field}_i)$
-----------	--

Value field definition:

ATM/SONET group address
Destination's MAC address
Recognition_request message sequence No.

(See Specification, pp. 20-21.)

AIRP\_Reconigition\_Detected TLV:

Type = 11	Length = $\sum_i \text{length}(\text{value\_field}_i)$
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Value field definition:

ATM/SONET group address
Destination's MAC address
Recognition_request detected sequence No.
Detected Port Information

AIRP\_Recognition\_Response TLV:

Type = 12	Length = $\sum_i \text{length}(\text{value\_field}_i)$
-----------	--

Value field definition:

ATM/SONET group address
Destination's MAC address
Sender's MAC address
Recognition_request detected sequence No.

AIRP\_Ack TLV:

Type = 13	Length = $\sum_i \text{length}(\text{value\_field}_i)$
-----------	--

Value field definition:

ATM/SONET group address
-------------------------

AIRP\_Nak TLV:

Type = 14	Length = $\sum_i \text{length}(\text{value\_field}_i)$
-----------	--

Value field definition:

ATM/SONET group address
-------------------------

(See Specification, pp. 22-23.)

The AIRP operation of an active NE, that is an NE that quests port identification, will be discussed in relation to the state diagram of Figure 5 (Appendix F). An NE which requests port

identification will be referred to as an active NE and an NE which receives a port identification message will be referred to as a passive NE. In this example, the active NE is a non-leader ATM NE. The AIRP finite state machine (FSM) is (re-) started when a node is started or re-set. The process begins in state 1 500, the idle state, in which it is assumed that system configuration has been completed. For example, the ATM NE NE-A1, would be configured to indicate which links are connected with which neighboring NEs. Note that, although the NE may be configured at this point to know which neighboring NE is connected through which link, the port interconnectivity is not known at this point. Link initialization could happen at system starting/re-set time and run time, and will trigger an AIRP state transition.. To ensure that only one recognition signal will be sent to a receiving side at one time, all the incoming link initialization requests may be placed in a first in first out (FIFO) queue, with only a request at the top of the queue being capable of triggering a state transition. It is also assumed that the default channel status (bits 6, 7, 8 of K2 byte) of the initialized link is 000 (Idle). If the NE has been reset, it sends an AIRP\_Reset message to its virtual leader NE. After processing any link initialization overhead, the ATM NE proceeds to state 2 502, the request state (see Specification, p. 23).

In state 2 502, the ATM NE sends an AIRP\_recognition\_request message to its leader NE. Included within the AIRP\_recognition\_request message is the ATM link number of the link of the request currently at the top of the queue. After sending the AIRP\_recognition\_request message the ATM NE awaits a grant message from the leader NE. If another recognition request arrives while the NE is in state 2, the request will be placed at the end of the requesting queue. If the NE receives a message from the passive NE leader before the NE receives the grant message

from its leader, the active NE leader, the active NE discards the passive leader's message. Once the active NE receives an AIRP\_recognition\_grant message from the active leader NE, the active NE will transition into the "insert state", state 3 504.

In state 3, the insert state 504, the active NE triggers its SONET interface driver to insert the test, or recognition, signal, as described above, into the link corresponding to the ports which are being discovered. Additionally, the active NE awaits the reception of an AIRP\_recognition\_detected message from the active leader NE and initiates a waiting-timer. In this state, if another link recognition request arrives, it is placed at the end of link recognition requesting queue. Any messages from the passive leader NE will be discarded. Once the active NE receives an AIRP\_recognition\_detected message from the active leader NE, the active NE transitions into state 4 506 and the waiting-timer is stopped. However, if the waiting-timer expires before the NE receives an AIRP\_recognition\_detected message from the active leader NE, the ATM NE transitions into State 5 508 (see Specification, pp. 23-24).

Once in the detected state 4 506 the active NE records detected information, such as the port binding information. This information may be placed in a database, or table, such as a port binding table. After recording this binding information, the active NE triggers its SONET interface driver to insert idle signal (000) into the link in question. Additionally, the active NE sends an AIRP\_recognition\_acknowledgement message to the active leader NE and initiates a waiting-timer. The ATM NE then transitions into state 6 510, the awaiting state. Any other link recognition request that arrives during state 4 is placed at the end of the requesting queue. Messages received from the passive leader NE will be discarded.

Returning, for a moment, to the notify state 5 508, the active NE indicates to the active leader NE that an anomaly has occurred and removes the link-request from the link recognition request queue and returns to state 1 500. If another link recognition request arrives during state 4, it is placed at the end of the requesting queue. Messages received from the passive leader NE will be discarded.

In the await state 6 510, the active NE stops the waiting timer and transitions to state 5 508 if it receives an AIRP\_reccognition\_Nak message from the active leader NE. Otherwise, the active NE should receive an AIRP\_recognition\_ack message from the active leader NE, in which case the NE de-queues the link recognition request and transitions to state 1 500. If another link recognition request arrives while the ATM NE resides in state 6, the active NE places the request at the end of the requesting queue. Messages received from the passive leader NE will be discarded (see Specification, pp. 24-25).

The AIRP operation of an active leader NE, that is an NE that serves requests for port identification, will be discussed in relation to the state diagram of Figure 6 (Appendix G). In this example, the active NE is a leader ATM NE. The AIRP finite state machine (FSM) is (re-) started when a node is started or re-set. The process begins in state 1 600, the idle state, in which it is assumed that system configuration has been completed, including the establishment of TCP connections with other NEs. Link initialization could happen at system starting/re-set time and run time, and will trigger an AIRP state transition. The active leader NE clears both its NE request queue and its own link recognition request queue and initializes a state variable my\_request\_status to 0. To ensure that only one recognition signal will be sent to a receiving side at one time, all the incoming link initialization requests may be placed in a first in first out

(FIFO) queue, with only a request at the top of the queue being capable of triggering a state transition. It is also assumed that the default channel status (bits 6, 7, 8 of K2 byte) of the initialized link is 000 (Idle). The leader NE checks its state variable: `my_request_status`. If the status is 0, the top of its link recognition queue is placed at the end of the active ATM NE request queue and sets the status to 1. If the current value of `my_request_status` is 1, the link recognition request is placed at the end of the link recognition queue. Incoming requests from the other ATM/active NEs is placed at the end of the recognition request queue. A reset message from a particular NE will cause the leader to remove all the NEs outstanding requests from the queue. As soon as the ATM NE request queue is non-empty, the process proceeds to state 2 602 (see Specification, pp. 25-26).

In state 2 602, the ATM NE retrieves an `AIRP_recognition_request` message from the top of its request queue and determines whether the sender is still “alive”. If not the message is placed at the end of the ATM NE request queue and succeeding messages are tested until a message associated with and “alive” requester is found. Upon finding such a message the ATM NE sends the `AIRP_recognition_request` message to the passive NE leader, a SONET NE leader in this example. After sending the `AIRP_recognition_request` message the ATM leader NE awaits a response message from the SONET leader NE. The ATM leader sends the message to the pre-configured SONET multi-cast address. It is assumed that there is not a TCP connection between the leaders, and that message-resend for several times, if no response is received within a timer period, is implicitly supported. If another recognition request arrives while the NE is in state 2, the request will be placed at the end of the requesting queue and, if the leader NE generates a recognition request of its own, it places the request at the end of its own ATM NE

request queue. An AIRP\_reset message from a particular ATM NE will cause the ATM leader to remove all of the NEs outstanding requests from the request queue. Reception of an AIRP\_Recognition\_Response message from SONET leader will transition into state 3 604, the response state.

In state 3, the response state 604, the ATM NE will check whether the current request is from itself. If it is, the NE will trigger its SONET interface driver to insert the recognition signal, as described above, into the link of interest. If request is from other NE, the leader NE sends an AIRP\_Recognition\_Grant message to the requesting NE. Additionally, the leader NE awaits an AIRP\_Recognition\_Detected message from the SONET (passive) leader and starts waiting-timer. If any other link recognition request of its own arrives, the request will be put to the end of its link-recognition queue. If any requests from other ATM NEs arrive, the request will be placed at the end of the leader-NE request queue. Any reset message from a particular ATM NE will cause the ATM leader to remove all of the NE's outstanding requests from the leader ATM-NE request queue. The reception of an AIRP\_Recognition\_Detected message from the SONET leader will transition the process into State 4, the detected state 606, and waiting-timer is stopped. If the waiting-timer expires or the NE receives an AIRP\_Nak message from the SONET leader, the leader will transition into State 5, the notify state 608 instead.

In. State 4, the detected state 606, the active ATM NE leader will record detected information, then check to see if the request is from itself and, if so, the leader NE will trigger its SONET interface driver to insert idle signal (000) into corresponding link. Then the NE sends an AIRP\_Ack message to itself. Otherwise, the leader NE sends an AIRP\_Recognition\_Detected message to the corresponding ATM NE. The reception of an



AIRP\_Ack message either from another ATM NE or from itself will transition the leader into State 6, the acknowledgement state 610. Any reset message from a particular ATM NE will cause the leader to remove all of the NE's outstanding requests from its ATM-NE request queue (see Specification, pp. 26-27).

In State 5, notify. state 608, if the request is from another NE, the ATM NE leader will send either AIRP\_Nak to notify the corresponding ATM NE that there is an error with the link currently being processed. The leader de-queues the corresponding request. If the request is from itself, the leader checks its link-recognition queue to see whether it is empty. If the queue is not empty, the leader NE will move the top request of its link-recognition queue to the end of the ATM-NE request queue. Otherwise, it will set my\_request\_status back to 0 again. The leader then transitions to state 1, the idle state, 600. If another link recognition request of its own arrives, the request will be placed at the end of the leader's link-recognition queue. If a request from another ATM NE arrives, the request will be placed at the end of the ATM-NE request queue. Any reset message from a particular ATM NE will cause the ATM leader to remove all of the NE's outstanding requests from the ATM-NE request queue.

In State 6, the Ack state 610, if nothing is received before the timeout, or if the leader receives an AIRP\_Nak message from the passive side during the timer period, the NE leader stops the timer and transitions to State 5, the notify state 608. Otherwise, the leader NE should receive an AIRP\_Ack message and, if the request is from another ATM NE, the leader sends an AIRP\_Ack message to corresponding ATM NE and transitions to State 1 600. During this state, if another link recognition request of its own arrives, the request will be put to the end of its link-recognition queue. If another request from another ATM NE arrives, the request will be put at

the end of the ATM-NE request queue. A reset message from a particular ATM NE will cause the ATM leader to remove all of the NE's outstanding requests from its ATM-NE request queue. During this state, the ATM NE will de-queue the link-request. If the request is from itself, it will check its link-recognition queue to see whether it is empty. If it is not, the leader NE will move the top of its link-recognition queue to the end of the ATM-NE request queue. Otherwise, the leader NE will set my\_request\_status back to 0 again and return to state 1, the idle state 600.

The operation of a non-leader passive NE is depicted in the state diagram of Figure 7 (Appendix H) which begins in the idle state 700 in which it is assumed that system configuration has been completed. Link initialization could happen at system starting/re-set time and run time, and will trigger an AIRP state transition. It is also assumed that the default channel status (bits 6, 7, 8 of K2 byte) of initialized link is 000 (Idle). In this state, the passive non-leader NE will discard any message sent by an ATM (active) leader. After receiving the AIRP\_Recognition\_Notification message from the SONET (passive) leader, the NE transitions to the polling state, state 2 702 (see Specification, pp. 27-28).

In State 2 702, the SONET NE starts polling its line interfaces with current link status as idle (bit 6,7,8 of byte K2 is 000), and starts a detection-timer. The NE will discard any message sent by the ATM leader. If the NE identifies a recognition signal associated with a particular line interface, the NE stops the timer, and transitions into State 3 704, the detected state. If the NE receives an AIRP\_Ack message from the SONET leader during the timer period, the NE stops polling and returns to State 1, the idle state 700. If the detection timer times out, the NE proceeds to the notify state, state 4 706.

In State 3, the detected state 704, the SONET NE sends an AIRP\_Recognition\_Detected message to the SONET leader, then awaits the return of an AIRP\_Ack message from the SONET leader. In this state the NE will discard any message sent by an ATM leader. The reception of the AIRP\_Ack Message sends the NE into state 5, the check state 708.

In State 4, the notify state 706, the SONET NE notifies the SONET leader that there is an error involving the link of interest, then returns to State 1, 700. During this state, the NE discards any message sent by the ATM leader. In State 5, the check state 708, the SONET NE checks the current link status of the just identified link. If the status returns to idle: 000, the NE sends an AIRP\_Ack message to the SONET leader and returns to the idle state, state 1 700. Otherwise, the NE sends an AIRP\_Nak message to the SONET leader and proceeds to state 4, the notify state 706. In this state, the NE will discard any message sent by the ATM leader.

The operation of a passive leader NE is depicted in the state diagram of Figure 8 (Appendix I) which begins in the idle state 800 in which it is assumed that system configuration has been completed. Link initialization, could happen at system starting/re-set time and run time, and will trigger an AIRP state transition. It is also assumed that the default channel status (bits 6, 7, 8 of K2 byte) of initialized link is 000 (Idle). After receiving an AIRP\_Recognition\_Request message from the ATM, leader the NE transitions to the multicast and polling state, state 2 802 (see Specification, pp. 28-29).

In State 2, the multicast and polling state 802, the SONET NE sends an AIRP\_Recognition\_Notification message to all the connected SONET NEs and starts polling its line interfaces with current link status as idle (bit 6,7,8 of byte K2 is 000). It also starts a detection-timer and returns an AIRP\_Recognition\_Response to the ATM leader. If the NE

identifies a recognition signal associated with particular line interface, it stops the timer. If the NE receives an AIRP\_Recognition\_Detected message from a particular SONET NE, it proceeds to state 3, the respond state 804.

In State 3, the detected state 804, the SONET leader NE sends an AIRP\_Recognition\_Detected message to the ATM leader, then awaits an AIRP\_Ack message from the ATM leader. When the AIRP\_Ack message is received, the NE will proceed to state 5, the Ack state 808 (see Specification, p. 29).

Appellant respectfully notes that the above summary of the invention, including any indication of reference numerals, drawings, figures, paragraphs, page numbers, etc. (collectively referred to as “descriptions” of the application) have been provided solely to comply with the U.S. Patent and Trademark Office’s rules concerning the appeal of the claims of the present application. As such, the descriptions above are merely exemplary and should not be construed to limit the claims of the present application in any way whatsoever.

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

The grounds of rejection to be reviewed on appeal are:

(i.) Whether or not the subject matter of claims 1, 2, 7-10, 12-15, 29-31, 34-37 and 39-41 is obvious in view of U.S. Patent No. 6,654,802 to Oliva (“Oliva”) in combination with U.S. Patent No. 6,549,513 to Chao et al. (“Chao”).

(ii.) Whether or not the subject matter of claims 3, 4, 32 and 33 is obvious in view of Oliva in combination with Chao and U.S. Patent No. 6,473,397 to Au (“Au”); and

(iii.) Whether or not the subject matter of claims 11 and 38 is obvious in view of Oliva in combination with Chao and U.S. Patent No. 5,870,382 to Tounai et al. (“Tounai”).

## VII. ARGUMENTS

(a) The Obviousness Rejections of Claims 1, 2, 7-10, 12-15, 29-31, 34-37 and 39-41

Claims 1, 2, 7-10, 12-15, 29-31, 34-37 and 39-41 were rejected based on a combination of Oliva and Chao.

Of the rejected claims, claims 1 and 30 are independent claims from which the remaining claims referenced above depend.

Independent claim 1 reads as follows:

A system comprising:

*a first type* of network element (NE) comprising;

a port for connection to another network element, the port configured to support at least one transport level overhead message wherein the first type of NE is configured to;

*transmit a request for port identification to one of a plurality of second type of NEs, receive a request for port identification from one of a plurality of the second type of NEs, and transmit a port detection signal in response to the received port identification wherein each of the requests and detection signal is transferred over an out of band channel.*  
(italics added)

Appellant respectfully requests that the members of the Board consider the italicized text in claim 1 for this appears to be the source of disagreement between the Examiner and the Appellant. Appellant notes that while independent claim 30 is directed at a method and not a system as in claim 1, for the purposes of this appeal, the same claimed features appear to be in dispute (see Appendix A for the text of claim 30).

Claim 1 is directed at a “first type” of network element (NE) which transmits a “request for port identification to one of a plurality of a second type of NEs,” receives similar requests for port identification from the second type of NEs and transmits a “port detection signal in

response” to one of the port identification signals it receives. The transmission and reception of the requests and detection signals are transferred between the two types of NEs via an out-of-band channel.

In contrast, as admitted in the Final Office Action, Oliva fails to disclose the use of two different types of NEs. Instead, the NEs disclosed in Oliva are the same type (e.g., they are circuit switched network elements). In addition, again as admitted in the Final Office Action, Oliva does not disclose or suggest the transmission of port identification requests or responsive port detection signals, as in the claims of the present invention.

To overcome these deficiencies, the Final Office Action relies on a combination of Oliva and Chao. However, Chao does not disclose or suggest the transmission of port identification requests or responsive port detection signals, as in the present invention. Instead, Chao discloses the transmission of a “confirmation response message” that is used to indicate that traffic has been switched from a restoration path to an original path after the original path has been fixed or restored. Such a message has nothing at all to do with the identification of a port through the use of port identification requests and responsive port detection signals, as in the claims of the present invention.

It is respectfully submitted that claims 1, 2, 7-10, 12-15, 29-31, 34-37 and 39-41 of the present invention would not have been obvious to one of ordinary skill in the art upon reading the disclosure of Oliva, taken separately or in combination with the disclosure in Chao, at the time the application was filed because neither discloses or suggests the use of a first and second type of network element and the use of port identification requests or responsive port detection

signals, as in claims 1, 2, 7-10, 12-15, 29-31, 34-37 and 39-41 of the present invention. Appellant respectfully submits that one of ordinary skill in the art would not equate the confirmation response messages in Chao, which are used to switch traffic from a restoration path to an original path, to the port identification requests or responsive port detection signals of claims 1, 2, 7-10, 12-15, 29-31, 34-37 and 39-41 of the present invention.

In addition to the above rationales, claims 9, 29 and 36 are not rendered obvious by Oliva, taken separately or in combination with Chao, because neither Oliva nor Chao (nor any of the cited references) discloses or suggests the use of a packet switching network element as in claims 9, 29 and 36 of the present invention.

Accordingly, Appellant respectfully requests that the Board reverse the decision of the Examiner and grant allowance of claims 1, 2, 7-10, 12-15, 29-31, 34-37 and 39-41.

(b) The Obviousness Rejections of Claims 3, 4, 32 and 33

Claims 3, 4, 32 and 33 were rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Oliva in view of Chao and further in view of Au. Because claims 3, 4, 32 and 33 depend on a claim which is patentable over the combination of Oliva and Chao for the reasons given above and because the addition of Au does not overcome the deficiencies of Oliva and Chao, claims 3, 4, 32 and 33 are also patentable over Oliva, taken separately or in combination with Chao and Au.

(c) The Obviousness Rejections of Claims 11 and 38

Claims 11 and 38 were rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Oliva in view of Chao and further in view of Tounai. Because claims 11 and 38 depend on a claim which is patentable over the combination of Oliva and Chao for the reasons given above and because the addition of Tounai does not overcome the deficiencies of Oliva and Chao, claims 11 and 38 are also patentable over Oliva, taken separately or in combination with Chao and Tounai.

**IX. CONCLUSION**

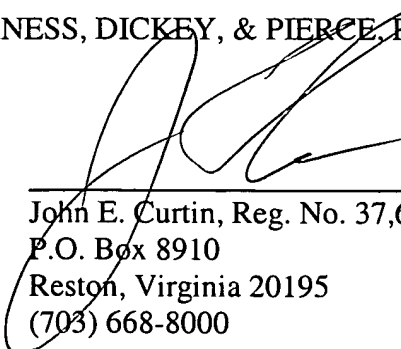
Accordingly, for at least the aforementioned reasons, Appellants respectfully request the Honorable Members of the Board of Patent Appeals and Interferences to reverse each of the outstanding rejections in connection with the present application and allow each of the pending claims in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No.08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

HARNESS, DICKEY, & PIERCE, P.L.C.

By:

  
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John E. Curtin, Reg. No. 37,602  
P.O. Box 8910  
Reston, Virginia 20195  
(703) 668-8000

JEC:psy